Carpinteria Groundwater Basin

- Groundwater Basin Number: 3-18
- County: Santa Barbara
- Surface Area: 8,120 acres (12.7 square miles)

Basin Boundaries and Hydrology

The Carpinteria Groundwater Basin is bounded on the north by consolidated rocks of the Santa Ynez Mountains, on the south and southwest by the Pacific Ocean, and on the west by contact of consolidated rocks of Toro Canyon. The eastern boundary underlies Rincon Creek. Surface drainage is by the Carpinteria, Franklin, Gobernador, Rincon, Toro Canyon, and Santa Monica Creeks. Average precipitation ranges from 15 to 19 inches.

Hydrogeologic Information

Water Bearing Formations

Groundwater is found in alluvium and the Carpinteria, Casitas, and Santa Barbara Formations. The average specific yield for the basin is estimated to be 10 percent (DWR 1999). The geologic information presented in this section can be found in Upson and Thomasson (1951) except where noted.

Alluvium. Holocene alluvium underlies and forms the main agricultural plains in the Carpinteria Basin. In some parts of the basin, the Holocene alluvium consists mainly of fine-grained clay and silt and some sand with local bodies of gravel at the base. The lower part of this alluvium contains thick beds of clay, which confine groundwater in the underlying formations. Pleistocene alluvium deposits occur at the mouths of Santa Monica Canyon and Arroyo Parida, and in the lower part of Toro Canyon. This alluvium has a thickness of as much as 250 feet and thins to the north against the consolidated rocks of the mountains, and to the south it underlies Holocene alluvium. Remnants may also be found on Shepard Mesa and adjacent terraces. The Pleistocene alluvium consists of clay, sand, and gravel in lenticular beds. Well yields are generally moderate. The primary water-yielding materials are the discontinuous lenses of gravel and sand, which occur at all depths and do not constitute any widespread zones.

Carpinteria Formation. The Carpinteria Formation is of Pleistocene age and consists of tan to brown unconsolidated to poorly consolidated sand containing variable amounts of gravel and cobbles. The Carpinteria Formation, which has a thickness up to 75 feet, is exposed primarily in the southeastern portion of the basin south of the Rincon Creek fault, though it may occur in the subsurface north of the Rincon Creek fault (GCI 1976).

Casitas Formation. The Casitas Formation is of Pleistocene age and consists of poorly to moderately consolidated clay, silt, sand, and gravel. It composes the foothills and terraces along Carpinteria, Gobernador, and Rincon Creeks, and also the northern part of the west-sloping terraces south and east of Carpinteria. These deposits lie at progressively greater depths to the south and west and range in thickness from approximately 1,000 feet beneath Shepard Mesa to more than 3,000 feet thick in the southern part of the basin. Electric log data indicate the Casitas Formation is 2,300 to 2,700 feet thick north of the Rincon Creek fault (GCI 1976). Water in the deposits

is confined and well yields are generally moderate. The Casitas Formation is the chief water-bearing unit in the basin (DWR 1999).

Santa Barbara Formation. The Pleistocene age Santa Barbara Formation consists of poorly to moderately consolidated marine sand, silt, and clay and has a thickness of 2,000 feet. This unit mainly underlies the steeply sloping area east of Rincon Creek and north of Highway 101, where it is overlain by terrace deposits. Groundwater in this unit is confined.

Restrictive Structures

Rincon Creek fault, which trends westward across the southeast portion of the basin, is a groundwater barrier (SBCWA 2001). North of the fault, groundwater is found in sediments, which have a total thickness of as much as 4,000 feet. South of the fault, groundwater is found in sediments, which have a total thickness up to 500 feet. Uplift of consolidated rocks along the south side of the Carpinteria fault is believed to restrict seawater intrusion (Upson and Thomasson 1951). Rincon Creek and Carpinteria faults are believed to act as barriers to seawater, as do overlying clay layers near Carpinteria Slough (SBCWA 2001).

Recharge Areas

Natural recharge of the basin is from infiltration of precipitation and streamflow, and to a limited extent, underflow (Fugro West 2000). Excess irrigation waters also recharge the groundwater system (Upson and Thomasson 1951).

Groundwater Level Trends

From 1947 to 1951, prior to the importation of surface water from Lake Cachuma, groundwater levels fell below sea level (CVWD 1996). Hydrographs since 1951 show a rise in water levels leading up to artesian conditions in 1979 (CVWD 1996). Groundwater levels declined as pumping increased during the drought of 1986 through 1991, but nearly returned to the historical high level brought about by the wet winter of 1993 (CVWD 1996). Groundwater flow generally is southward.

Groundwater Storage

Groundwater Storage Capacity. Total storage capacity of the basin was estimated to be 700,000 af (GCI 1976; CVWD 1996). DWR (1975) estimated the storage capacity at 140,000 af.

Groundwater in Storage. The usable water in storage was estimated at nearly 500,000 af (Toups 1974). The total volume of water in storage in the basin above sea level is estimated at 700,000 af by SBCWA (2001). The usable capacity is listed as 19,000 af by DWR (1975).

Groundwater Budget (Type A)

Between 1984 and 2000, total groundwater pumpage in the basin averaged about 3,779 af/yr and ranged from a low of 2,740 af/yr in 1999, to a high of 5,377 af/yr in 1990 (Fugro West 2001). For 1984 through 2000, the mean estimated private pumpage is 1,972 af/yr and the mean estimated pumping by CVWD is 1,807 af/yr (Fugro West 2001). The average long-term seepage

loss from creeks is about 700 af/yr (Upson and Thomasson 1951). The long-term average for natural recharge from precipitation and seepage loss was estimated to be 1,700 af/yr (Upson and Thomasson 1951). For 1935 through 1973, the average annual subsurface inflow was 890 af/yr and the average subsurface outflow was 340 af/yr (Jones 1979). The average consumptive use by phreatophytes for 1935 to 1973 was 120 af/yr (Jones 1979).

Groundwater Quality

Characterization. Groundwater in the Carpinteria Basin is predominantly calcium bicarbonate in character, with varying amounts of sodium. The TDS content ranges from 600 to 900 mg/L (Fugro West 2000; Fugro West 2001). Analyses of 4 public supply wells show an average TDS content of 557 mg/L in the basin, with a range of 515 to 600 mg/L. SBCWA (2001) reports TDS content levels ranging from 436 to 980 mg/L.

Impairments. In general, water quality is reported as stable, with no trends toward impairment (Fugro West 2000); however, in the western portion of the basin, historical data show elevated nitrate concentrations (Fugro West 2001). Groundwater analyses conducted in 1985 show nitrate levels below the recommended maximum contaminant level of 45 mg/L for public water systems (SBCWA 2001).

Water Quality in Public Supply Wells

Constituent Group[1]	Number of wells sampled[2]	Number of wells with a concentration above an MCL[3]
Inorganics – Primary	4	0
Radiological	4	0
Nitrates	4	0
Pesticides	4	0
VOCs and SOCs	4	0
Inorganics – Secondary	4	3

[1] A description of each member in the constituent groups and a generalized discussion of the relevance of these groups are included in *California's Groundwater – Bulletin 118* by DWR (2003).
[2] Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.
[3] Each well reported with a concentration above an MCL was confirmed with a second detection above an MCL. This information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

Well Production characteristics

	Well yields (gal/min)	
Municipal/Irrigation	Range: max 500	Average: 300
	Total depths (ft)	
Domestic	Range: - 504	Average: 504 (DWR 1999)
Municipal/Irrigation	Range: 175-1,245	Average: 748 (DWR 1999)

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
CVWD, USGS	Groundwater levels	41 wells/monthly
CVWD, USGS	Miscellaneous water quality	41 wells
Department of Health Services and cooperators	Title 22 water quality	4

Basin Management

Groundwater management:	The Carpinteria Valley WD has adopted an AB 3030 plan.
Water agencies	
Public	Carpinteria Valley WD
Private	

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